

**MOBILE ENERGY  
CLINIC PROGRAM**

**Local Energy Efficiency  
Program Proposal**

**January 15, 2002**

***Submitted in Response to:***  
**California Public Utilities Commission**  
**R.01-08-028**  
**2002 Energy Efficiency Program Selection**

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## **1. PROGRAM OVERVIEW**

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ADM Associates, Inc. (ADM) is proposing to implement a Mobile Energy Clinic Program as a Local Nonresidential Energy Efficiency Program for Program Years 2002 and 2003. The Mobile Energy Clinic (MEC) Program that we are proposing is a continuation and extension of the Mobile Energy Clinic and Diagnostics Services Program that ADM implemented for Southern California Gas Company (SoCalGas) during 2001. Our program for Southern California Gas was very successful. Indeed, SDG&E is also now proposing a Small Business Energy Assessments Program as a Local Nonresidential Program that is explicitly “modeled after the Southern California Gas’s successful Mobile Energy Clinic program”.

### **1.1 BRIEF DESCRIPTION OF PROGRAM**

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The Mobile Energy Clinic Program that we are proposing for different areas is focused on improving energy efficiency for small businesses by implementing no-cost/low-cost measures to improve energy efficiency and by providing diagnostics of energy-using equipment for small businesses. For the small businesses that participate in the program, we make actual no-cost/low-cost improvements to their equipment. We also test the performance of their HVAC performance and evaluate lighting systems and other energy using equipment, such as water heaters, compressors and process equipment checked for proper use. Owners/managers are given a checklist of other energy efficiency actions that they can take.

We are proposing to implement the Mobile Energy Clinic Program in those areas within utility service territories (i.e., PG&E, SCE, SoCalGas, and SDG&E) where the heating and cooling requirements are relatively high. These areas, which are generally the inland areas of the different utility service territories, are depicted in the map that is included in Section 3 where customer eligibility is defined. Because both electric and gas measures are considered, funding will be from both electric public goods charges and gas surcharges.

### **1.2 PROGRAM RATIONALE**

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Our target for the Mobile Energy Clinic Program is owners/operators of small commercial businesses occupying buildings with less than 5,000 square feet of floor area, particularly businesses in strip malls, small convenience stores, laundromats, and non-chain restaurants. Owners of these types of small businesses are a “hard-to-reach” market for energy efficiency services and products for several reasons.

- Until recently the costs of energy have not been large enough to be noticed by small business owners.

- Many small business owners are not aware of what changes can be made to improve energy efficiency for their businesses and what these improvements can do for them.
- Owners of small businesses are often recent immigrants, whose primary language is not English. Thus, information disseminated through mass media channels are not likely to have much influence on them. However, our experience with the Mobile Energy Clinic Program that we implemented for SoCalGas is that a high percentage of non-English-speaking businesspeople are receptive to energy efficiency information when presented to them by a person speaking their language.
- The primary interest and concentration of these business owners is on maintaining a profitable operation. With their primary focus on running their business, these owners generally do not have the time available to attend seminars or to read and digest materials mailed to them. Nevertheless, most owners/operators of small businesses are business-savvy and responsive to ways to reduce their costs or improve the quality of service they offer their customers.

For these reasons, our proposed Mobile Energy Clinic Program uses a targeted and direct approach to market energy efficiency to owners/operators of small businesses and to encourage them to improve the energy efficiency of their operations. For all of the businesses that we visit, we target HVAC (both for space cooling and for space heating) and lighting for improvement. In addition, we target end-uses that are found in particular types of businesses, including refrigeration in small convenience stores and water heating in laundromats and restaurants.

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### **1.3 PROGRAM OBJECTIVES**

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Table 1-1 provides summary information regarding our objectives for the proposed Mobile Energy Clinic Program.

Table 1-1. Proposal Summary for Mobile Energy Clinic Program

<b>Program Name</b>	Mobile Energy Clinic
<b>Program Category</b>	Nonresidential Hard-to-Reach
<b>Budget</b>	\$3,300,000.00
<b>TRC Ratio</b>	1.73
<b>PPT Ratio</b>	3.15
<b>Annual kWh Savings Target</b>	12,468,625 kWh
<b>Annual Peak kW Reduction Target</b>	19,734 kW
<b>Annual Therm Savings Target</b>	69,875 therms
<b>Other Performance Targets</b>	6,500 sites
<b>Program Strategies</b>	Implement and recommend energy efficiency measures
<b>Target Market Segments</b>	Small Nonresidential Comprehensive Retrofit

As shown by the summary data in Table 1-1 and by the rest of our proposal, the Mobile Energy Clinic Program satisfies various criteria that the CPUC has specified for local efficiency programs.

- The Mobile Energy Clinic Program provides long-term annual energy (gas and electric) savings and electric peak demand reductions by actually performing no-cost/low-cost energy efficiency improvements, by identifying measures that owners/operators of small businesses can implement to improve the energy efficiency of their operations and by following up with the owners/operators to encourage them to make the improvements. It also educates small business owners on energy efficiency by having them see what is to be done to improve energy efficiency. Savings beyond those claimed for the implemented measures will be realized as some of the small businesses implement some or all of the other energy efficiency measures that we recommend.
- The Mobile Energy Clinic Program is cost effective in the savings it provides per dollar of cost, providing a TRC of 1.73 and a PPT of 3.15. (These test results are documented in Section 4 and in the accompanying spreadsheet.)
- The Mobile Energy Clinic Program addresses major market barriers for improving energy efficiency in small businesses. These barriers include the lack of information about energy efficiency among owners/operators of these facilities and their usually constrained financial circumstances. The program overcomes these barriers by using a direct marketing approach with site visits and by actually providing energy efficiency services to the small businesses visited. Indeed, there will be high customer participation because there is no

cost to the business for the services provided to implement the no-cost/low-cost measures or for the energy efficiency recommendations.

- The Mobile Energy Clinic Program has strong equity considerations in that it is targeted toward small businesses, a segment of the market that has traditionally been hard to reach with other programs.
- The Mobile Energy Clinic Program is innovative, using a one-to-one marketing approach to bring information about energy efficiency to the owners/operators of small businesses.
- The Mobile Energy Clinic Program provides peak demand savings by actually implementing no-cost/low-cost energy efficiency improvements that reduce energy demand at peak times.
- The Mobile Energy Clinic Program has synergies with programs run by utilities and other entities in that it provides a vehicle for directing owners/operators of small businesses to programs that can provide them further assistance or financial incentives (e.g., Express Efficiency).

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## **2. PROGRAM PROCESS**

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Our process for the proposed Mobile Energy Clinic builds directly on the process and procedures that we have been using over the past year in implementing a similar program in the service territory of Southern California Gas Company during 2001. We already have in place all of the personnel, equipment, and procedures needed to operate the Mobile Energy Clinic Program during PY 2002 and PY 2003.

Market research has shown that the most effective way of delivering energy efficiency to owners/operators of small businesses is through face-to-face interactions at individual facilities that allow the owners/operators to watch and see what is being done to improve energy efficiency. As discussed in Section 3, owners/operators of small businesses represent a “hard-to-reach” market. Research into this market segment to identify the common practices of owners/operators of independently owned businesses has shown that owners/operators of small businesses are usually busy with the day-to-day operation of their facilities and do not feel they can afford the time to attend workshops and seminars or to read and digest materials on available energy efficiency measures and rebates that are mailed to them.

Accordingly, we use the Mobile Energy Clinic Program to provide no cost/ low cost energy efficiency services to owners and/or operators of small, independently owned businesses and to recommend energy efficiency improvements to them. There are two major objectives for the Mobile Energy Clinic Program.

- The first objective is to implement no-cost/low-cost energy efficiency improvements for facilities occupied by small businesses.
- The second objective is to educate the owners/operators of small businesses on how they can reduce their utility bills by implementing other energy efficiency measures that may require investment.

Owners and/or operators of businesses who qualify for the program are targeted using lists of businesses that we compile from various sources, including local governments, chambers of commerce, and business directories. The target audience is defined to be independently owned and operated small businesses. That is, chain-operated businesses are not in the target market for this program.

We implement the Mobile Energy Clinic Program on a turnkey basis through a direct sales strategy. We identify areas with high concentrations of small businesses. For these areas, we market the program door-to-door to small businesses occupying facilities with less than 5,000 square feet of floor area. We use multilingual (e.g., Spanish, Chinese, Vietnamese, Farsi, Arabic) engineers

working in three-person teams to do this marketing and performing the energy efficiency work. Each team uses a van equipped with the tools needed to provide the services (e.g., ladders, filters, laptop computers and printer, coil cleaning equipment, thermostats, etc.) (See Figure 2-1.)



*Figure 2-1. An ADM Mobile Energy Clinic Team and Van*

At each of the businesses we visit, our field staff perform various no-cost/low-cost energy efficiency improvements, as appropriate. Besides making these no-cost/low-cost improvements, we make a walk-through evaluation to provide the owner/operator with other opportunities for saving energy at their facility or store.

Upon arrival for an on-site energy consultation, our field person introduces himself as being from ADM Associates, Inc. Each consultation begins with a walk-through inspection of the facility, allowing the field person to record specific information about energy-using aspects of the facility (e.g., HVAC, refrigeration, lighting) and particular areas where gains in energy efficiency can be made in businesses. We address the following technologies in the walk-through inspection:

- Energy efficient lighting
- Energy efficient space heating and cooling
- Refrigeration



For the walk-through evaluation of energy efficiency opportunities, we use a checklist that is based on established energy auditing procedures to assess energy efficiency improvements and to perform diagnostics on energy-using equipment.

Following the walk-through inspection, our field personnel make no-cost/low-cost improvements for energy efficiency and provide diagnostics of energy-using equipment for the small business. The no-cost/low-cost improvements that we make include testing HVAC performance, cleaning condensor coils, changing filters, and installing a programmable thermostat. (We have found that less than one percent of small businesses have already installed programmable thermostats.) We also evaluate lighting systems, water heaters, compressors and process equipment and check them for proper use.

Many of the no-cost/low-cost improvements that we make will apply to HVAC and gas water heating units. Examples of the no-cost/low-cost improvements for HVAC units that we implement on-site include the following.

- At sites that do not have them, we will install programmable thermostats and program them. We program the thermostats to match a business's operating schedule.
- Small businesses normally do not clean condenser coils as a matter of course. However, a dirty condenser coil results in a lower heat transfer, and therefore a lower efficiency. We use a commercially available HVAC coil cleaner to effectively clean the condenser coils. Cleaning coils can improve the efficiency of the A/C units by 6% to 8%.
- The return air filter will be checked. Dirty filters will be replaced. The increased air flow due to clean filters will improve gas furnace and A/C unit efficiency.
- Refrigerant lines will be inspected for proper insulation. If the insulation is damaged, or has been removed, it will be replaced with new insulation.
- For water heaters we reset the temperature to the lowest setting required for the business' specific needs.
- We adjust outside air dampers, if such adjustment is needed. Proper adjustment of outside air dampers can reduce both gas and electricity use.
- We identify whether there is proper refrigerant charge and airflow.
- If an economizer is present, we check to see that it is operating properly.

We expect that some visits will be made to types of businesses that have particular types of energy-using equipment. No-cost/low-cost improvements are made at these businesses that are specific to the type of end-use.

- For stand-alone cases for refrigeration and freezing in small convenience stores, we make a number of checks to determine whether various no-cost/low-cost improvements can and should be made.
  - The insulation on both the liquid and suction lines of refrigeration cases often becomes ripped and/or torn from the insulating positions on the liquid and suction refrigerant lines. Accordingly, we make a simple visual check of the lines and repair or re-insulate the lines as needed to restore efficiency and save on the kW used by the facility.
  - We check the condenser coils on refrigeration condensing units. If these coils are dirty, we clean them.
  - We check the operation of the condenser fan for current draw and against the nameplate data. It is also checked for truing by observation.
  - We check the door gaskets by observation and make recommendations for any changes or repairs.
- In the case of non-chain restaurants, we insulate all non-insulated (or poorly-insulated) hot water pipes. We also provide the owner advice and information on high-efficiency gas cooking equipment, high-efficiency dishwashing equipment, and high efficiency water heaters.
- In laundromats/dry cleaners, we insulate all non-insulated (or poorly-insulated) steam pipes. We also provide information on high-efficiency steam boilers. For coin-operated laundry facilities where attendants are present, we insulate all reachable hot water pipes and implement other no-cost energy strategies identified under the existing SoCalGas coin-operated laundry programs.

We also give the business owners/managers a checklist of other energy efficiency actions that they can take. The face-to-face interaction from visiting individual businesses allows us to educate the owners/operators and make them aware of the importance of energy efficiency by providing them information about lighting, HVAC, and refrigeration measures that is customized to each particular facility or store. This customized approach increases the probability that the owner/operator will have the information and motivation necessary to follow up and to participate in other programs.

The information given to a business regarding potential energy efficiency improvements is specific to that facility. Each of our field teams is equipped with

a laptop computer that it uses to analyze the economics of energy efficiency for the different end uses that are specific to the particular facility and to demonstrate to the owners/operators what the savings for their facility would be. An example of the on-site audit form prepared for each facility is included as an attachment in Section 10. The computer program used for the analysis of energy and cost savings associated with the energy efficiency measures has been developed specifically to be used for small business facilities. The program uses algorithms that we have developed using extensive data on the physical and thermal characteristics of small businesses, the results of extensive building energy simulations with DOE 2, and published monitored end-use data. HVAC savings are computed that are specific to each of the 16 climate zones defined by the California Energy Commission for California. The costing of the measures is accomplished with data from the DEER data base.

Recommendations regarding energy efficiency improvements are made based on the existing equipment observed, and worksheets are completed for the recommended improvements, estimating the potential energy savings and payback periods. Available financial assistance programs are discussed and rebate forms reviewed, showing the decision-maker payment options.

We use the presentation and explanation of the worksheets as the opportunity to introduce the business owners to the energy efficiency products and services that are being offering through utility statewide and other third-party programs.

- For all businesses with HVAC units, we provide lists of energy efficiency HVAC equipment changes for which rebates are available through other program. These measures will include the following:
  - Package terminal air conditioners
  - Time clocks
  - Reflective window film
  - Evaporative coolers
- For all businesses, we provide lists of the lighting energy efficiency improvements for which rebates are available through other programs. These measures include the following:
  - Screw-in compact fluorescent lamps
  - Hard-wired fluorescent fixtures
  - High efficiency exit signs
  - Induction lamps and fixtures
  - Electronic ballasts
  - T-5 or T-8 lamps and electronic ballasts

- Interior high-intensity discharge fixtures
- Exterior high-intensity discharge fixtures
- Occupancy sensors
- Photocells
- Time clocks
- Owners of small convenience stores with refrigeration cases are given a list of measures that improve the energy efficiency of refrigeration and that are covered in the Express Efficiency Program. The measures most likely to be applicable for “mom and pop” convenience stores include the following:
  - Night covers for display cases
  - Strip curtains for walk-in boxes
  - Glass or acrylic doors
  - New refrigeration display cases with doors
  - Efficient lighting for display cases
  - Insulation for bare suction lines
  - Door gaskets for coolers or freezers
  - Auto-closers for coolers or freezers
  - Evaporator fan controllers

We make a follow-up telephone call to an owner/operator at 4 weeks after the site visit. Through these calls, we determine whether the businesses have proceeded to implement any of the recommendations for energy efficiency improvements. We also ask if we can provide any assistance in their selecting of a vendor to perform the improvements or any additional information they might need to proceed with the implementation.

As appropriate, we pass information from our marketing efforts to trade allies to equip them to “close the deal” on selling energy efficient equipment to an interested small business.

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### 3. CUSTOMER ELIGIBILITY

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We have defined the target population for the Mobile Energy Clinic Program to include individually-owned small commercial businesses occupying less than 5,000 square feet of floor space. The major portion of such businesses use less than 20 kW of electricity or less than 10,000 therms of natural gas. However, there are some small businesses that will qualify because they have equipment that causes their energy use to exceed 20 kW (e.g., refrigeration in small “mom and pop” grocery stores).

Evidence on the size of the market that we are targeting is provided in Table 3-1, which show the number of businesses with electricity use less than 20 kW for different utility service territories.

*Table 3-1. Businesses with Electric Demands of 20 kW or less  
by Utility Service Territory (1999 Data)\**

<i>Type of Business</i>	<i>Utility Service Territory</i>			<i>Business Type Total</i>
	<i>PG&amp;E</i>	<i>SCE</i>	<i>SDG&amp;E</i>	
Industrial	23,110	38,738	5,932	67,780
Institutional	16,895	36,073	11,170	64,138
Office	41,881	70,710	14,923	127,514
Other	115,740	264,258	59,623	439,621
Retail	57,853	68,936	12,325	139,114
Total	255,479	478,715	103,973	838,167

\*Memorandum, “Overview of Statewide Nonresidential Population”,  
M. Rufo, Xenergy, to M. O’Drain, PG&E, 2/08/2000.

As can be seen, the potential target market is relatively large when full service territories are considered. However, we are proposing to implement the Mobile Energy Clinic Program for particular business types and primarily in areas within the service territories where heating and cooling requirements are relatively high.

- With respect to business types, we target primarily retail stores, restaurants, convenience stores, and other types of business service establishments.
- The geographic areas that we target are shown on the map in Figure 3-1. These targeted areas are areas with relatively high heating and/or cooling requirements, primarily inland areas.

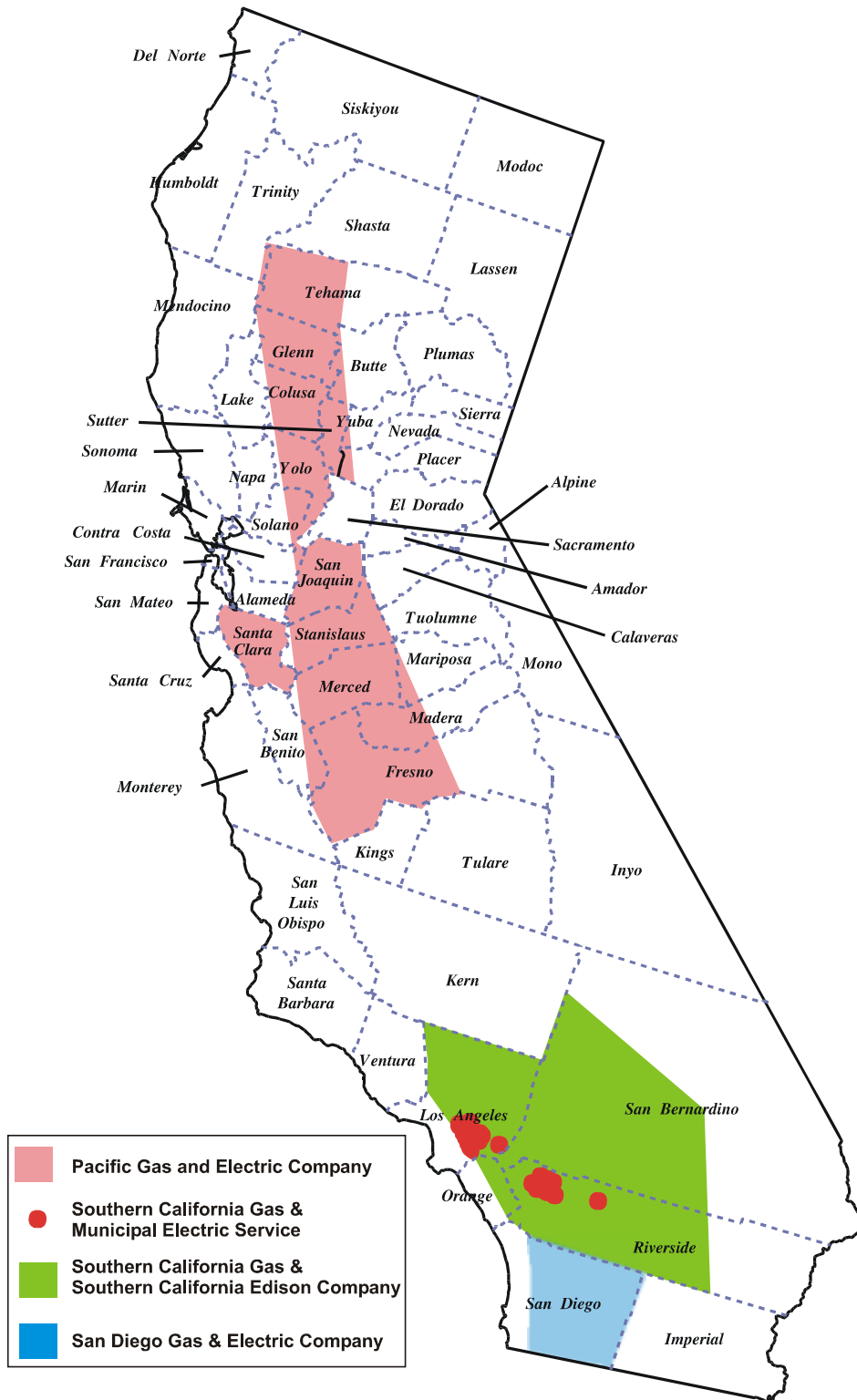


Figure 3-1. Areas Targeted for Mobile Energy Clinic Program

Because of the relatively large numbers of small businesses in the targeted areas, our proposed Mobile Energy Clinic Program will complement, not compete, with programs that utilities and other third party implementors may offer for small businesses. We will coordinate the Mobile Energy Clinic Program with any other service programs offered by utilities or third parties to make sure that we do not overlap or compete to provide services to the same businesses.

We target the Mobile Energy Clinic Program to owners/operators of small, independently owned small businesses because these types of businesses are a “hard-to-reach” market for energy efficiency services. There are several characteristics of these businesses that make them hard-to-reach.

- Until recently the costs of energy have not been large enough to be noticed by owners/operators of small businesses.
- Many owners/operators of small businesses are not aware of what energy efficiency improvements can be done for their facilities and what these improvements can do for them.
- Owners of small businesses are often recent immigrants, whose primary language is not English. Thus, information disseminated through mass media channels are not likely to have much influence on them.
- The primary interest and concentration of these business owners is on maintaining a profitable operation. With their primary focus on running their business, these owners generally do not have the time available to attend seminars or to read and digest materials mailed to them.

Nevertheless, most owners/operators of small businesses are business-savvy and responsive to ways to reduce their costs or improve the quality of service they offer their customers. For these reasons, a targeted and direct approach to marketing energy efficiency can be effective in encouraging owners/operators of small businesses to improve the energy efficiency of their operations.

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## 4. COST-EFFECTIVENESS CALCULATIONS

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We have used the cost-effectiveness spreadsheet provided by the CPUC to calculate the cost-effectiveness of the Mobile Energy Clinic Program. The summary results from these calculations are reported in Table 4-1. These calculations assume savings only from no-cost/low-cost energy services provided to the businesses.

*Table 4-1. Summary Results of Cost-Effectiveness Calculations  
for Mobile Energy Clinic Program  
(Calculated using only savings from no-cost/low-cost energy services)*

<b>Test</b>	<b>Costs</b>	<b>Benefits</b>	<b>Ratio</b>	<b>Net Benefits</b>
TRC test	\$2,747,500	\$4,740,997	1.726	\$1,993,497
Participant test	\$2,762,500	\$8,688,746	3.145	\$5,926,246

The cost effectiveness results for the Mobile Energy Clinic Program depend on several factors:

- Number of businesses visited;
- Number of businesses for which energy efficiency improvements are implemented (i.e., percent of businesses for which improvements are applicable);
- Savings per implemented improvement;
- Avoided cost per unit of energy (electricity or gas) saved.

The expected numbers of businesses that will be visited are reported in Table 5-1 in Section 5 (Program Performance Goals).

The electric savings that result from different no-cost/low-cost energy services performed for small businesses through the Mobile Energy Clinic Program are shown in Table 4-2; gas savings are shown in Table 4-3. Also shown in these tables are the percent of businesses for which the no-cost/low-cost energy services are likely to be applicable. The estimates of applicability are based on our experience in implementing this type of program for Southern California Gas Company over the past year. These are the only savings claimed for determination of TRC and PPT.

Additional electric and gas savings may result from other recommendations for energy efficiency improvements that are made to the small businesses. The electric savings estimates from such recommendations are reported in Table 4-4; gas savings estimates are reported in Table 4-5. These savings have not been claimed in the cost-effectiveness calculations reported in Table 4-1.



*Table 4-2. Expected Electric Savings from Different No-Cost/Low-Cost Energy Services  
Performed for Small Businesses through Mobile Energy Clinic Program  
(Claimed in TRC Test)*

<i>No-Cost/Low-Cost Service</i>	<i>Average kWh Saved</i>	<i>Percent Applicable</i>	<i>Average kWh/ Site</i>	<i>Average kW</i>	<i>Percent Applicable</i>	<i>Average kW/ Site</i>
Replace air filter	320	0.81	259	0.51	0.81	0.41
Add or replace refrigerant line insulation	504	0.59	297	0.80	0.59	0.47
Lower water heater operating temperature	29	0.07	2.03	0.05	0.07	0.00
Add or replace hot water line insulation	169	0.04	7	0.28	0.04	0.00
Clean condenser coil	338	0.97	328	0.53	0.97	0.52
Reprogram existing thermostat	534	0.01	5	0.00	0.01	0.00
Install and program new thermostat	903	0.99	894	0.00	0.99	0.00
Comb the condenser fan coil	127	0.99	126	0.20	0.99	0.20
<b>Weighted Total</b>			<b>1,918</b>			<b>1.60</b>

*Table 4-3. Expected Gas Savings from Different No-Cost/Low-Cost Energy Services  
Performed for Small Businesses through Mobile Energy Clinic Program  
(Claimed in TRC and PPT Tests)*

<i>No-Cost/Low-Cost Service</i>	<i>Average Therms</i>	<i>Percent Applicable</i>	<i>Average Therms/ Site</i>
Lower water heater operating temperature	25	0.30	7.5
Check and replace hot water line insulation	13	0.25	3.3
<b>Weighted Total</b>			<b>10.8</b>

*Table 4-4. Expected Electric Savings from Different Energy Efficiency Improvements That May Be Recommended to Small Businesses through Mobile Energy Clinic Program (Not Claimed in TRC and PPT Tests)*

<b>Recommended Energy Efficiency Improvement</b>	<b>Average kWh Saved</b>	<b>Percent Applicable</b>	<b>Average kWh/ Site</b>	<b>Average kW</b>	<b>Percent Applicable</b>	<b>Average kW/ Site</b>
Change lighting to T-8 fluorescent with electronic ballasts.	3,442	0.99	3,409	1.23	0.99	1.22
Replace all incandescent lighting with compact fluorescent lighting.	842	0.86	724	0.10	0.86	0.08
Change incandescent EXIT signs to high-efficiency lighting signs.	315	0.50	158		0.50	0.00
Have ductwork tested and sealed.	462	0.83	383	0.73	0.83	0.61
Insulate exposed air conditioning duct.	340	0.99	337	0.54	0.99	0.53
Install water heater blanket.	227	0.13	30		0.13	0.00
Upgrade to higher efficiency model water heater when replacing.	329	0.13	43		0.13	0.00
Upgrade to SEER 12 or higher efficiency model air-conditioner when replacing.	668	0.98	655	1.06	0.98	1.04
Install self-closers on all exit doors.	210	0.73	153	0.33	0.73	0.24
Replace non-insulated ice machine dispenser box with an insulated dispenser box.	1,270	0.08	102	0.29	0.08	0.02
Install self-closing doors on reach-in boxes.	2,173	0.07	152	0.50	0.07	0.03
Install air curtain or plastic door strips	5,839	0.12	723	1.33	0.12	0.17
Install new gaskets around reach-in or walk-in box doors.	1,460	0.11	161	0.33	0.11	0.04
Replace incandescent display spot lighting with high efficiency spot lighting.	938	0.15	141	0.21	0.15	0.03
<b>Total</b>	<b>18,515</b>		<b>7,169</b>	<b>6.65</b>		<b>4.01</b>

*Table 4-5. Expected Gas Savings from Different Energy Efficiency Improvements That May Be Recommended to Small Businesses through Mobile Energy Clinic Program (Not Claimed in TRC and PPT Tests)*

<b>Recommended Energy Efficiency Improvement</b>	<b>Average Therms</b>	<b>Percent Applicable</b>	<b>Average Therms/ Site</b>
Install water heater blanket.	30	0.25	7.5
Upgrade to higher efficiency model water heater when replacing.	37	0.17	6.3
<b>Total</b>	<b>67</b>		<b>13.8</b>

## 5. PROGRAM PERFORMANCE GOALS

The overall program performance goal for the Mobile Energy Clinic Program is to deliver energy efficiency services to small businesses in different utility service territories in the numbers shown in Table 5-1.

*Table 5-1. Target Numbers of Businesses*

<i>Utility Service Territory</i>	<i>PY 2002</i>	<i>PY 2003</i>	<i>Total</i>
PG&E	900	1,800	2,700
SCG Gas/Municipal Electric	500	1,000	1,500
SCG Gas/SCE Electric	500	1,000	1,500
SDG&E	*	800	800
<b>Total</b>	<b>1,900</b>	<b>4,600</b>	<b>6,500</b>

\*SDG&E has proposed the Small Business Energy Assessments Program for PY 2002 in their submittal. That program is explicitly modeled on the Mobile Energy Clinic Program that we implemented during 2001 for SoCalGas. Accordingly, we have not designated any small businesses in SDG&E's service territory to receive energy efficiency services through the Mobile Energy Clinic Program during PY 2002.

We use the visits to implement no cost/low cost energy efficiency changes and to provide the owners/operators of these small businesses with recommendations for energy efficiency improvements that they can make to lower their electricity and gas usage and costs. The savings from services performed at the sites are shown in Table 5-2.

*Table 5-2. Total Savings from Services Performed at Sites*

<i>Utility Service Territory</i>	<i>PY 2002</i>			<i>PY 2003</i>			<i>Totals</i>		
	<i>Savings MWH</i>	<i>Savings kW</i>	<i>Savings Therms</i>	<i>Savings MWH</i>	<i>Savings kW</i>	<i>Savings Therms</i>	<i>Savings MWH</i>	<i>Savings kW</i>	<i>Savings Therms</i>
PG&E	1,726.4	1,440	9,675	3,452.9	2,880	19,350	5,179.3	4,320	29,025
SCG Gas/Municipal Electric	959.1	800	5,375	1,918.3	1,600	10,750	2,877.4	2,400	16,125
SCG Gas/SCE Electric	959.1	800	5,375	1,918.3	1,600	10,750	2,877.4	2,400	16,125
SDG&E	--	--	--	1,534.6	1,280	8,600	1,534.6	1,280	8,600
<b>Total</b>	<b>3,664.7</b>	<b>3,040</b>	<b>20,425</b>	<b>8,824.0</b>	<b>7,360</b>	<b>49,450</b>	<b>12,468.6</b>	<b>10,400</b>	<b>69,875</b>

The data presented in Section 4 show that significant savings can be achieved if small businesses have some relatively straightforward energy efficiency improvements implemented. Accordingly, a related goal of the program is to work with owners/operators of the small businesses that we visit to help them actually implement the recommendations. This includes guiding the owners/operators to participate in other local or statewide programs that will provide financial assistance to install energy efficiency improvements. These will include rebate/incentive programs being offered by the investor-owned utilities

through their statewide efforts or through local programs implemented by other third-party implementors.

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## **6. EVALUATION, MEASUREMENT AND VERIFICATION PLANS**

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This section discusses our approach to performing the evaluation, measurement and verification work for the Mobile Energy Clinic Program and to reporting on program progress.

### **6.1 APPROACH TO EVALUATION, MEASUREMENT AND VERIFICATION**

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As part of the implementation plan that we prepare for the Mobile Energy Clinic Program, we prepare a plan for measuring and evaluating the program's effects, including the savings that result. Our preliminary outline of that plan is presented here. A more detailed plan would be prepared for the implementation plan.

We measure and evaluate the effects of the Mobile Energy Clinic Program using two major types of data.

- First, we assess the number of small businesses who received visits and who actually implemented the energy efficiency improvements that were recommended to them during the site visits. As discussed in Section 6.2, we use our program tracking system to provide these data.
- For each business that we visit, we estimate the savings that are being achieved in electricity and gas usage for that business from the services that we provided. This will include developing estimates of savings for improvements to the following:
  - Indoor lighting
  - Outdoor lighting
  - Refrigeration
  - Space heating
  - Air conditioners

We estimate the savings a business has realized from our services through a two-step process.

- We first estimate the savings resulting from the no-cost/low-cost energy services that were provided to the business.
- We then estimate the savings that result from the implementation of any other energy efficiency improvements that we recommended to a business. For this purpose of our evaluation effort, we collect additional information through telephone surveying in which we ask a sample of visited businesses about the types of energy efficiency improvements that they have made in response to the recommendations we gave them. We develop a sampling plan to determine the number of businesses to survey.

To make the estimates of savings, we use information about the characteristics of the particular facility, the number of measure units installed, and unit energy savings estimates from published sources (e.g., CEC's Database for Energy Efficient Resources (DEER)), any deemed savings value that the CPUC has approved, and our own in-house data. (Note that ADM was a subcontractor on the project team that prepared the latest version of the DEER, and therefore are completely familiar with the energy savings and implementation cost estimates in that database and how they are derived.)

## **6.2 REPORTING REQUIREMENTS**

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Although we have procedures in place for implementing the Mobile Energy Clinic Program, we do need to coordinate our work with that of the utilities and other parties who have programs that may also involve promoting energy efficiency among small businesses. Accordingly, we prepare an implementation plan at the start of the program that specifies the process and procedures that we will be using to implement the program and to coordinate our work with that of others. We submit this plan to the CPUC and the CPUC-designated contract manager for review and approval.

From our work in implementing and evaluating other energy efficiency programs, we know the importance of having good information in a program tracking system in order to track the progress of the program and to evaluate its effects. For the Mobile Energy Clinic Program, we already have in place the system for tracking the work, based on the work for SoCalGas that we have conducted over the past year. This tracking system is a full system that includes procedures, policies, protocols, forms, data entry and the data storage methods. The system is up and running and will require little modification to tailor it to meet the data collection and reporting requirements involved in our implementing of the Mobile Energy Clinic Program.

We use the system to track specific types of information that enable us to evaluate the progress of the program and our efforts. The information that we track includes the following:

- Name and address of each small business visited;
- Utilities serving the store and electricity and gas account numbers for each business;
- Basic characteristics of business (e.g., square footage); and
- Energy efficiency measures recommended for the business.

During the course of the program, we use the tracking system to prepare monthly reports that detail the previous month's activities and progress towards meeting the goals of the program. Each monthly report includes information on the number of businesses contacted, their characteristics and locations.

At the end of the program, we use the data in the tracking system to prepare an evaluation of the program's effects. This evaluation will include information about all activities undertaken as part of the program, including the number of businesses that received services through the Mobile Energy Clinic Program and the specifics on the measures recommended to and then implemented by each business. Estimates of savings are also provided for each business.

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## **7. DESCRIPTION OF ADM'S QUALIFICATIONS**

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This section provides information on the qualifications of ADM Associates and of the personnel who will be the staff for the Statewide Convenience Stores Energy Efficiency Outreach Program.

### **7.1 ADM'S QUALIFICATIONS**

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Our ability to implement the Mobile Energy Clinic Program is based on our considerable experience in working with small business firms to improve energy efficiency. Since beginning business in 1979, ADM Associates, Inc. has worked with utilities throughout the country to implement large-scale programs to help small commercial firms use energy more efficiently.

The Mobile Energy Clinic Program that we are here proposing extends the program that ADM has been implementing for Southern California Gas Company during 2001. Our program for SoCalGas focused on improving energy efficiency for small businesses by making no-cost/low-cost improvements for energy efficiency and by providing diagnostics of energy-using equipment for small businesses. Small businesses that participated in this program had actual no-cost/low-cost improvements made to their equipment. They also had their HVAC performance tested, condensor coils cleaned, filters changed, lighting systems evaluated, and other energy using equipment such as water heaters, compressors and process equipment checked for proper use. Owners/managers were given a checklist of other energy efficiency actions that they can take. We provided energy services to nearly 900 small businesses through our program for Southern California Gas.

ADM's qualifications are based more generally on long experience in working with small businesses to improve the energy efficiency of their operations. We have conducted programs to market energy efficiency services to small business firms for various clients, including the California Energy Extension Service, the Bonneville Power Administration, Entergy Services, Northern States Power, El Paso Electric, and Colorado Springs Public Utilities Department.

- **Lodging Industry Energy Education Program**

*For:* Southern California Gas Company

Through the Lodging Industry Energy Education Program, ADM visited hotels/motels in SoCalGas's service territory and offered their operators hands-on assistance to identify ways in which they can improve energy efficiency and save energy in their facilities. The Lodging Industry Energy Education Program demonstrated that a hands-on approach is a very effective approach to getting small business owners to think about energy and to take



actions to improve energy efficiency. We visited over 900 lodging facilities during 2000 and have visited over 400 more in 2001.

- **Upstream High-Efficiency Gas Water Heater Program**

*For:* Southern California Gas Company

Since 1999, ADM has been under contract to SoCalGas to implement an upstream high efficiency gas water heater program. The purpose of this program is to increase the sales of higher efficiency gas water heaters by working with manufacturers, wholesaler/distributors, water heater dealers, and plumbing contractors throughout SoCalGas's service territory. Our work includes meeting with the market actors, preparing point-of-purchase materials for retailers, and providing incentives.

- **Beverage Vending Machine Program**

*For:* Southern California Edison Company

Under contract with SCE, we are implementing an Energy Savings Program for Beverage Vending Machines. We are installing VendingMisers™ or time clocks (as appropriate) on 3,400 vending machines in SCE's service territory. The control strategies are defined by (1) whether the vending machine is lighted and (2) whether the location of the machine will permit use of a time clock or requires use of a VendingMiser™. Most of these savings will go to small commercial customers, who are a particular target for the program.

- **Duct Efficiency Programs**

*For:* Pacific Gas and Electric  
Southern California Edison  
Southern California Gas  
San Diego Gas and Electric

Under the California Board for Energy Efficiency's third party program, ADM was under contract with the four major investor-owned utilities in California (i.e., Pacific Gas and Electric, Southern California Edison, San Diego Gas and Electric, and Southern California Gas) to implement residential duct efficiency programs throughout California. The Duct Efficiency Programs were aimed at institutionalizing good duct design and establishing retrofit duct repair as a component of HVAC maintenance. Through the Duct Efficiency Program, we provided HVAC and/or sheet metal contractors with the information, procedures, and technologies that they could use to market duct leakage inspection and repair services to residential single-family and multi-family houses. Through the program, contractors were educated and

trained on how to provide duct inspection and repair services as a viable business venture. Contractors were taught new techniques and procedures that were explicitly designed under this program in order to be effective and not too expensive. Contractors who participated in the programs were also assisted in identifying households who are interested in having their duct system inspected and repaired.

- **RCP Training**

*For:* Southern California Gas  
Southern California Edison

ADM is conducting training workshops to provide training to HVAC contractors to better equip them to participate in the Residential Contractors' Program. One aspect of the training is to provide training in central air conditioner/central heat pump diagnostic tune-up, duct testing and duct sealing in conjunction with SCE/SoCalGas Installation Standards. The other aspect is to provide an overview of the RCP fulfillment process from consideration of installation of energy efficiency measures through completion of work and contractor payment. This overview includes proper completion of program-related paperwork, including Incentive Voucher/Application and Customer Information and Declaration forms.

- **Local Energy Assistance Program**

*For:* Southern California Edison  
Pacific Gas and Electric  
Southern California Gas

ADM developed a program that we implemented throughout California to provide assistance to the planning departments in selected communities to encourage energy efficiency in new industrial and commercial developments that are being proposed in those communities. This program included directly influencing specific development plans and providing assistance to the planning departments of the local governments to plan/approve planning and zoning areas, based on energy use as well as other infrastructure criteria presently used. We also disseminated information regarding the results of these energy planning activities to other communities. Our program in California was funded at \$1.2 million by the major utilities (i.e., Pacific Gas and Electric, Southern California Edison, and Southern California Gas).

- **Energy Efficiency Site Surveys of Commercial, Industrial, and Agricultural Facilities**

*For:* Pacific Gas and Electric

In this project for PG&E, we are conducting surveys of commercial, industrial, and agricultural customer facilities to identify and analyze the energy efficiency opportunities using the 1-2-3 tiered approach to energy conservation. For Tier 1, we identify and analyze the no-cost energy efficiency opportunities in each customer facility. For Tier 2, we identify and analyze the low-cost energy efficiency opportunities in each customer facility. For Tier 3, we identify and analyze customer facilities with a view to identifying energy efficiency opportunities that will require major financial investments on the part of the customers. All recommendations target and prioritize measures and technologies that deliver both immediate and long-term peak-period kW demand savings and annual kWh and therm savings.

- **Energy and Water Efficiency Services Support**

*For:* Colorado Springs Utilities

Under this contract with the City of Colorado Springs Utilities, ADM provided energy and water efficiency services for CSU's industrial and large commercial customers. We provided feasibility evaluations for energy and water efficiency projects and provided design plans for energy and water efficient projects. In addition, we provided training on energy and water efficiency projects for CSU staff.

- **Technical Support to Demand Side Management Unit**

*For:* Jamaica Public Service Company, Ltd.

Under a contract with the Jamaica Public Service Company, ADM is providing technical support to JPSCo's Demand Side Management Unit. We have provided a Resident Consultant who works with JPSCo staff in planning demand-side management programs for JPSCo's customers. Subject areas for which we are providing technical support include program planning and implementation, cogeneration feasibility studies, energy auditing, building codes, simulation modeling, monitoring, and program evaluation.

- **Technical Audits for Large Industrial Customers**

*For:* Power Agency of California

Under contract with the Power Agency of California, we conducted audits of large industrial electricity customers in order to identify appropriate energy

efficiency improvements. To support this activity, we developed the audit form to be used in data collection, conducted on-site interviews of plant personnel on facility operations, collected other relevant data on-site, evaluated the collected data, and prepared engineering estimates of the energy savings for energy efficiency improvements for each of the audited facilities. Estimates of expected savings were developed through engineering calculations or through simulations with computerized energy analysis models.

- **Business Energy Advocates Program for Small Business**

*For:* California Energy Extension Service

ADM provided marketing and technical support services on energy conservation for a program to encourage small business firms in California to adopt techniques and technologies that reduce energy consumption and costs. The program was also intended to reduce the barriers encountered by business firms in gaining access to energy management techniques and practices. We identified energy conservation measures that are particularly applicable to given types of businesses and supported their applications for utility company incentive payments and low-interest small business loans.

- **Commercial Audits Project**

*For:* Entergy Services, Inc.

For Entergy, we performed the Commercial Audits Project. We performed on-site audits at about 650 commercial facilities throughout Entergy's service area. Using the data collected through these audits, we prepared customer-specific DOE-2 analyses of energy savings from conservation measures. We prepared audit reports for the individual customers and also aggregated the data to prepare system-level estimates of the saturations of various end-use technologies and DSM measures.

- **Energy Audit Services for Small and Medium Commercial and Industrial Customers**

*For:* El Paso Electric

For El Paso Electric, ADM provided energy audit services to its small- and medium-size commercial and industrial customers. We conducted energy audits for approximately 250 small C&I customers and for approximately 75 medium C&I customers. The audit services included collecting data on-site, preparing an analysis of energy use and potential energy efficiency measures

(using our CPA 123 model), and preparing an audit report for each customer audited.

Our ability to inform owners/operators of small convenience stores about energy efficiency opportunities derives from our hands-on experience in collecting and analyzing data on energy use for commercial facilities.

- We have conducted energy audits on nearly 3,000 commercial and industrial facilities for such clients as Niagara Mohawk Power, Entergy Services, Northern States Power, El Paso Electric, Wisconsin Electric Power, Iowa Southern Utilities, Centerior Services Company, the Bonneville Power Administration, San Diego Gas and Electric, and Rochester Gas and Electric.
- We have conducted on-site surveys of nearly 10,000 commercial and industrial facilities for clients such as Entergy Services, Northern States Power, Union Electric, Central Illinois Public Service, Florida Power and Light, Alabama Power Company, El Paso Electric, the Bonneville Power Administration, Southern California Edison, Pacific Gas and Electric, the California Energy Commission, the Sacramento Municipal Utility District, San Diego Gas and Electric and other utility companies.

## **7.2 KEY PERSONNEL**

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This program requires expertise in market analysis and program design and implementation. Our team for this program provides these required capabilities.

- The principal point of contact between the CPUC's designated Contract Manager and the project team is ADM's project manager, Mr. Taghi Alereza. Mr. Alereza will provide overall technical leadership and will ensure that excellent staff support will be available to the project. He will direct the program design efforts and will be responsible for liaison with the Contract Manager.
- Market analysis and research and measurement and evaluation activities will be directed by Dr. Donald Dohrmann, who is director of economic studies at ADM.
- The day-to-day program manager will be Dr. Safdar Chaudhry, who is a Senior Project Manager at ADM.

Short biographical sketches for these and other key personnel for the project are provided in the following paragraphs. Full resumes are provided in Section 10, Attachments.

**Taghi Alereza**, P.E., who is President of ADM, will be the Principal-in-Charge of the work. Mr. Alereza is a nationally recognized expert in building energy simulation and modeling. He has pioneered the development of several state-of-the-art simulation procedures and models. Mr. Alereza has led ADM's effort to develop and implement two statewide residential programs during the 1998 program year. He conceived and developed the "Residential Duct Efficiency Program," which was implemented in the service territories of Pacific Gas and Electric, Southern California Edison, Southern California Gas and San Diego Gas and Electric. Mr. Alereza also conceived the Local Energy Assistance Program (LEAP), which was implemented in the PG&E, SCE and SCG service areas. This program provided extensive training to developer/builders, local government staff and elected officials. He has directed program design and implementation including

- Upstream High Efficiency Residential Water Heater Program - implemented for Southern California Gas Co.
- Refrigerated Vending Machine Cycling Program - designed and implemented for Southern California Edison Co.
- Performance Assurance Project - designed and implemented simplified building commissioning project for Southern California Edison Co. and San Diego Gas and Electric Co.
- Mobile Energy Clinic – designed and implemented for Southern California Gas Co.
- Lodging Industry Education And Audit Program – designed and implemented for Southern California Gas Co.

Mr. Alereza holds a Bachelor of Mechanical Engineering degree from Auburn University and has completed an MS and the coursework for D.Sc. in mechanical engineering from the George Washington University. He is a member and past chairman of ASHRAE Technical Committee 9.6 (Energy Utilization), which is responsible for developing and applying protocols for assessing energy use in buildings, and the cognizant TC for the ASHRAE Standard 90.2. He is a registered professional engineer in California.

**Dr. Safdar Chaudhry** a Senior Engineer at ADM Associates, Inc., will serve as the day-to-day project manager. While at ADM, Dr. Chaudhry has performed engineering analysis and evaluations for several residential, commercial and industrial facilities conducted for several utilities including PGE, SMUD, SCE and B.C. Hydro. He conducted on-site inspections, analysis, energy conservation recommendations and report preparation in most of these projects, and has been responsible for organizing and managing several other energy efficiency

improvement projects. He developed energy conservation evaluation procedures, monitored field staff, and reviewed recommended energy measures for the Mobile Energy Clinic program conducted for Southern California Gas Company. He also developed energy auditing and measure evaluation procedures conducted for the Lodging Industry Education Program conducted for SCG. Dr. Chaudhry has been responsible for hundreds of building energy simulations using DOE-2, CALRES and other computer simulation programs. Dr. Chaudhry has a Ph.D. in Mechanical Engineering from the University of Birmingham, a M.S. in Mechanical Engineering from George Washington University and a B.S. in Mechanical Engineering from the University of Engineering and Technology in Pakistan.

**Dr. Donald Dohrmann** is a Principal of ADM Associates and Director of Economic Studies. He will be responsible for market analysis and measurement, evaluation, and verification for the program. Dr. Dohrmann has technical expertise in economics, survey design, and statistical analysis. He has developed and applied analytical methodologies for evaluating DSM programs, including evaluations of Portland General Electric's commercial new construction programs, Northern States Power's high efficiency motors and adjustable speed drives programs, Pacific Gas and Electric's Commercial New Construction Program and its Nonresidential Energy Management Services Programs. He has been responsible for designing the statistical sampling plans for surveys of residential, commercial and industrial firms that ADM has conducted for various companies, including Pacific Gas and Electric Company, Southern California Edison Company, the Bonneville Power Administration, Florida Power and Light, B.C. Hydro, Kansas City Power and Light, El Paso Electric, Southern California Edison Co., the Sacramento Municipal Utility District, San Diego Gas and Electric Co., and many other utilities. He has also been responsible for preparing and conducting the analysis of the data collected in these surveys. Dr. Dohrmann received his B. S. in economics from Iowa State University and his M. A. and Ph. D. in economics from Yale University.

**Lon Smith** is a Mechanical Engineer at ADM Associates, Inc., responsible for development and conducting training in the areas of HVAC systems. He has extensive experience in refrigeration, transport and control systems in residential, commercial and industrial buildings. During his previous employment of 20 years with United Refrigeration Inc., Honeywell Inc., and New England Sheet Metal Works, Inc., he has developed an exceptional understanding of not only the theoretical aspects of HVAC and refrigeration systems, but also he has mastered the practical side of these systems as well. In the past, he has provided consultation to HVAC designers, and has conducted training in refrigeration and

control systems. Mr. Smith was an instructor at the State Center College District. He taught classes in pneumatic, electrical and electronic controls for commercial, residential and industrial mechanical systems. He has also taught classes on refrigerant types and their application, refrigerant recovery and power distribution systems, and their application to power line carrier transmissions. Some of the projects that Mr. Smith has been responsible for include:

- Upstream High Efficiency Water Heater Program, performed for Southern California Gas Co. Responsible for coordination of wholesalers, verification and payment.
- Mobile Energy Clinic, performed for Southern California Gas Co. Development of procedures and conducting training of field staff.

Mr. Smith is a licensed Energy Auditor for the Environmental Protection Agency and the California Energy Commission. He earned his Bachelor of Arts in Communications from California State University Fresno.

**Angelo Mineo**, who is a Senior Engineer at ADM, has considerable experience in on-site data collection and end-use monitoring. For the past eight years at ADM, he has conducted on-site data collection and end-use monitoring for many major utilities in the U.S. As an end-use monitoring specialist, he has conducted end-use metering of many commercial and industrial buildings. His experience includes on-site data collection, installing, inspecting and verifying monitoring equipment and validating collected data for our projects for B.C. Hydro, Northern States Power, Entergy Services, Inc., SCE and Los Angeles Department of Water and Power. Examples of specific tasks that Mr. Mineo has conducted include:

- Performed data collection and end-use monitoring for the Commercial Program Evaluation conducted for Central Power and Light Co. in Texas.
- Performed data collection and end-use monitoring of fixed and adjustable-speed motors for the evaluation of Northern States Power's Motors program.
- Performed data collection and end-use monitoring of Commercial buildings in Arkansas, Texas, Mississippi and Louisiana for the development of end-use load shapes for Entergy Services Co.
- Has been conducting on-site inspections and data collection for the Nonresidential Retention study being conducted for Southern California Edison Co. for the past 6 years.

Mr. Mineo earned his Bachelor of Science in Electrical Engineering from California State Polytechnic University.



**Cyrus Davehlo** is a Mechanical Engineer at ADM. For the past ten years, Mr. Davehlo has been a field engineer and trainer for the surveys of residential, commercial and industrial customers that ADM has conducted for Georgia Power, Alabama Power, Wisconsin Electric Power, Northern States Power, Portland General Electric, and many other utilities. He will be participating in on-site data collection and end use monitoring of lighting and supply fans. He has personally collected on-site data for over 1,500 buildings in the last ten years. In this work, he has collected data on industrial processes, HVAC and lighting systems in a wide variety of commercial and industrial facilities. Examples of specific projects that Mr. Davehlo has participated in include:

- Conducted on-site data collection for two major commercial saturation studies conducted for Florida Power and Light Co.
- Conducted on-site data collection and energy audits of commercial buildings for El Paso Electric Co.
- Conducted on-site data collection for non-residential buildings for two projects conducted for Northeast Utilities.
- Conducted on-site data collection for energy audits conducted in Arkansas, Louisiana, Mississippi and Texas for Entergy Services Co.

Mr. Davehlo graduated from Florida Atlantic University with a B.S. degree in Mechanical Engineering.

**Mahmoud Fouladi**, a Mechanical Engineer at ADM, has considerable experience in performing energy audits and building energy analysis, recommending energy efficiency measures and providing quality control for various commercial and industrial projects. During the past seven years he has participated in more than ten major commercial & industrial data collection projects conducted by ADM. He has been conducting on-site data collection on commercial and industrial facilities as a member of the field staff for the Non-Residential Measure Retention Study that ADM has been performing for Southern California Edison for the past five years. Other projects that Mr. Fouladi has participated in include:

- Performed on-site data collection and monitoring of lighting and HVAC motors for three projects conducted for Central Power and Light Co. in Texas.
- Performed on-site data collection for the evaluation of the New Commercial Construction Program conducted for Portland General Electric Co. The on-site data were used to develop DOE-2 simulations.
- Performed on-site data collection of commercial buildings for the Saturation Study conducted for Southern California Edison Co.

Mr. Fouladi earned his M.S. degree in Mechanical Engineering from George Washington University and his B.S. in Mechanical Engineering from Howard University.

**Richard Burkhart** serves as the Senior Technical Editor at ADM Associates, Inc. As technical editor, his responsibilities include copy-editing, graphic design and production for documentation, marketing materials, survey questionnaires, and webpage design for ADM projects. He was in charge of publishing marketing materials for the Duct Efficiency Training Program, Upstream High-Efficiency Gas Water Heater program and several other energy efficiency marketing programs performed for California utilities. He has produced marketing materials, a project newsletter and maintained the project website for the Lodging Industry Education Program that ADM performed for *Southern California Gas Co.* For *Kansas City Power and Light Co.* he developed automated templates using the data linking functions in Microsoft Word and Excel to generate site reports. He has also performed similar work for projects for *Southern California Edison Co.* Prior to joining ADM, he worked as a freelance editing assistant, performing editing, graphic production and page layout for a series of operating manuals for computerized production equipment. Mr. Burkhart earned his B.A. degree in Communications from California State University, Fullerton.

Additional ADM field staff who will perform work on this project include:

- Steve Lee
- Hao Ly
- Ha Nguyen
- Van Thanh Nguyen
- Kenny Thai
- Khoi Tran

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## 8. TIMELINE FOR PROGRAM IMPLEMENTATION

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Our proposed timeline for implementing the Mobile Energy Clinic Program is shown in Table 8-1. This timeline is for an program covering 19 months that includes the latter half of PY 2002 and all of PY 2003.

*Table 8-1. Timeline for Implementing Mobile Energy Clinic Program*

<i>Activity</i>	<i>Target Date</i>
Program Begins	5 Days After Contract Approval
Program Implementation Plan	3 Weeks After Project Start Date
Evaluation, Measurement & Verification Plan	5 Weeks After Contract Approval
First Quarter Report	3.5 Months After Contract Approval
Second Quarter Report	Quarterly
Third Quarter Report	Quarterly
Fourth Quarter Report	Quarterly
Fifth Quarter Report	Quarterly
Sixth Quarter Report	Quarterly
Program Completion	December 2003

## 9. PROGRAM COST PROPOSAL

Our cost proposal for the Mobile Energy Clinic Program is detailed in Table 9-1.

*Table 9-1. Budget Summary*

Item	First Year Cost	Second Year Cost	Total Cost
<b>Administrative Costs</b>			
Labor	\$ 88,500.00	\$ 206,500.00	\$ 295,000.00
Benefits			\$ -
Overhead			\$ -
Travel costs	\$ 4,200.00	\$ 9,800.00	\$ 14,000.00
Reporting costs			\$ -
Materials & Handling	\$ 4,800.00	\$ 11,200.00	\$ 16,000.00
General and Administrative costs	\$ 9,750.00	\$ 22,750.00	\$ 32,500.00
Subcontractor costs (include same line items)			\$ -
IOU Administrative Fee (only for non-IOU programs)	\$ 46,800.00	\$ 109,200.00	\$ 156,000.00
<b>Direct Implementation Costs</b>			
Itemized (may be estimated) • Energy efficiency services - 6,500 sites @ \$425 / site	\$ 828,750.00	\$ 1,933,750.00	\$ 2,762,500.00
<b>Evaluation, Measurement and Verification Costs</b>			
Direct labor		\$ 24,000.00	\$ 24,000.00
Other direct costs	\$ -	\$ -	\$ -
<b>Other Costs</b>			
<b>TOTAL BUDGET</b>	<b>\$ 982,800.00</b>	<b>\$ 2,317,200.00</b>	<b>\$ 3,300,000.00</b>

The budget allocation by program year and utility service territory is shown in Table 9-2.

*Table 9-2. Budget Allocation by Utility Service Territory*

Utility Service Territory	PY 2002	PY 2003	Total
Pacific Gas & Electric	\$ 465,536	\$ 906,730	\$ 1,372,266
Southern California Gas /Municipal Electrics	\$ 258,632	\$ 503,740	\$ 762,372
Southern California Gas /Southern California Edison Electric	\$ 258,632	\$ 503,740	\$ 762,372
San Diego Gas and Electric	--	\$ 402,990	\$ 402,990
Total	\$ 982,800	\$ 2,317,200	\$ 3,300,000

Our proposed payment schedule is shown in Table 9-3.

*Table 9-3. Proposed Payment Schedule*

<b>#</b>	<b><i>Event</i></b>	<b><i>% Payment</i></b>
1	Acceptance Of Final Program Implementation Plan	25%
2	Acceptance Of Evaluation, Measurement And Verification Plan	10%
3	Acceptance Of Quarterly Reports (Payments To Be Determined Proportional To The Number Of Implementations Performed)	50%
4	Final Payment Based On Evaluation, Measurement And Verification Results	15%

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## **10. ATTACHMENTS**

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**Taghi Alereza**  
**Principal & Director of Engineering**

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Mr. Alereza, a Principal of ADM Associates, Inc. and Director of the Engineering Division, is a recognized expert in energy analysis, energy modeling, energy forecasting, and system evaluation. He has been responsible for the development of several state-of-the-art contributions in the energy modeling field. These contributions have centered on energy analysis and energy forecasting for the residential, commercial, and industrial sectors. During his 25 years of professional experience, Mr. Alereza has successfully managed highly technical projects for over thirty major utility companies, the Department of Energy, California Energy Commission, and Electric Power Research Institute.

**California Statewide Programs**

Mr. Alereza has led ADM's effort to develop and implement two statewide residential programs during the 1998 program year. He conceived and developed the "Residential Duct Efficiency Program," which was implemented in the service territories of Pacific Gas and Electric, Southern California Edison, Southern California Gas and San Diego Gas and Electric. Mr. Alereza directed the development of the procedures for duct leakage tests and repairs, the training curriculum for HVAC contractors, marketing materials and program evaluation protocols. The Duct Repair program is being considered as an item with the most amount of incentives in the 1999 residential SPC program. Mr. Alereza also conceived the Local Energy Assistance Program (LEAP), which was implemented in the PG&E, SCE and SCG service areas. This program provided extensive training to developer/builders, local government staff and elected officials.

**Program Evaluation**

Mr. Alereza has managed several commercial, industrial and residential impact evaluations for Detroit Edison, Portland General Electric, Pacific Gas and Electric, Delmarva Power, BC Hydro, and Consumers Power Company. ADM designed the sample for participants and non-participants, collected the data, prepared baseline simulations of HVAC energy use, evaluated the energy impacts of the programs, and conducted all metering-related work, including installing, maintaining and removing metering equipment, collecting and verifying metered data on energy use and using these data to calibrate procedures for simulating such energy use.

Mr. Alereza has also managed various new construction evaluations for Pacific Gas and Electric, San Diego Gas and Electric, Southern California Edison Company and BC Hydro. ADM assessed the actual (realized) impact of several post-implementation program parameters, first-year annual energy savings, load shape impacts, net-to-gross and persistence impacts, incremental customer equipment and installation costs, and total customers' costs.

Pacific Gas and Electric's Commercial New Construction Program entailed an evaluation of realized savings for participant and non-participants using data on building equipment and characteristics; economic and attitudinal characteristics of the businesses involved; and billing and/or end-use metered data. In addition, monitoring equipment was installed in a subsample of the buildings to measure end-use electricity under "as operated" conditions.

ADM Associates provided analysis of the impacts of SDG&E, SCE and BC Hydro's energy efficiency programs. We conducted more than 300 high-resolution on-site surveys and correlated the results to billing data and local weather data. SDG&E and SCE's evaluations included additional parametric runs compared the energy use of the buildings under Title 24 conditions, as-built conditions and per incentivized measures. The data from the decision makers' survey was combined with the results of the DOE-2 parametric analysis to perform the overall net-to-gross analysis.

### **End Use Metering**

Mr. Alereza has been the principal-in-charge on monitoring projects that collected data from more than 500 buildings in various locations.

He is currently managing Phase I and Phase II of an end-use metering project for Entergy Services Inc. ADM is performing this project to provide baseline end-use information for commercial buildings in Entergy's service area. We are installing monitoring equipment at 40 commercial buildings throughout Entergy's four-state service area and will be collecting end-use data from these buildings over the next year. End uses being monitored include space heating, air conditioning, and lighting, as well as end uses important in particular types of buildings (e.g., refrigeration in grocery stores).

As part of Pacific Gas & Electric Company's Collaborative Process program verification efforts, ADM conducted short-term monitoring of end uses in commercial and industrial buildings, both before and after conservation measure implementation. Data were analyzed to identify actual energy savings associated with each end use at each site and included in a comprehensive summary report prepared for each site. For Southern California Edison, ADM provided technical support for end-use metering of 50 commercial buildings. For San Diego Gas & Electric Company, ADM conducted its commercial end use and thermal storage monitoring project. We installed data acquisition systems at over 100 selected buildings with chillers and/or thermal storage systems in SDG&E's service territory. For all projects, ADM was responsible for recruiting the buildings for the program, preparing the meter installation plan, verifying the meter installation, and for validating the end-use data collected. Data validation is accomplished using our Load Profile Viewer, a custom-designed software program for reviewing and validating end-use load profile data. Installed equipment included current transformers, Btu meters, flow meters and temperature sensors.



He was responsible for the development of Data Analysis and Reporting System (DARS), a microcomputer software package that graphically displays metered end-use load data. DARS was developed as a coordinated set of SAS (Statistical Analysis System) programs that can extract end use load data from a mainframe data base and prepare the data for analysis and reporting. For simple reporting purposes, DARS can produce daily load profile plots, percent energy distribution pie charts, and energy distribution bar charts. For data analysis, DARS can produce load profile plots for various options, including individual site plots, plots for distributions across monitored sites, and plots for weighted averages across sites.

### **Industrial End-Use Data Analysis**

Mr. Alereza managed two major industrial data collection and DSM evaluation projects for Bonneville Power Administration and Wisconsin Electric Power Company. The BPA project included development of a comprehensive database of available industrial DSM measures and their impact on industrial energy use by end-use. The WEPCO project included development of data collection procedures and collection of detailed industrial end-use inventory for 150 industrial facilities in Wisconsin. Also included in this project is a detailed analysis of end-use and process energy use and development of an industrial end-use analysis model.

### **Commercial Building End-Use Energy Data Collection and Analysis**

For the past 15 years, Mr. Alereza has been responsible for data collection and analysis of several thousand commercial facilities throughout the United States. He has managed two major data collection and analysis projects on non-residential buildings for the Bonneville Power Administration. He has managed similar projects for many utilities including Pacific Gas & Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, Florida Power & Light, Alabama Power, Rochester Gas & Electric Company and Union Electric. He has also been responsible for the development of several analysis models being used by many researchers.

### **Simplified Calculation Method (SCM)**

Mr. Alereza developed the Simplified Calculation Method (SCM) which is the commercial building energy standard compliance tool for the California Energy Commission. The concept used in SCM was based on the variable-based degree-day method which was originally developed by Mr. Alereza for the National Bureau of Standards. The SCM provides capabilities for analysis of daylighting, evaporative coolers, and solar water heaters.

### **Building Energy Use Determination**

Mr. Alereza was the program manager on a program which resulted in the development of a methodology for determining energy use in residential and commercial buildings in the U.S. Army facilities. This methodology employs

non-computerized procedures and renders computer approach accuracy without the cost and the effort involved in the computer simulation. He was a major contributor to a program which evaluated the correlation between building component structure and energy consumption in new and old residential buildings in the Baltimore/Washington area in 1972. The analysis techniques and concepts developed in this program were expanded and served as a basis for a similar evaluation of single- and multi-family housing in 10 geographic regions of the United States. Mr. Alereza was the principal investigator on this program, and his responsibilities included the technical direction of tasks which defined typical buildings for each location, determined their energy consumption patterns, and evaluated the energy savings that could be achieved through selected structural modifications.

### **Building Infiltration Measurement and Modeling**

Mr. Alereza had participated in several outdoor air infiltration and ventilation studies. He modified and extensively used the infiltration model developed by the National Research Council of Canada to develop a simplified hourly infiltration model. He also developed another air infiltration model which calculates the outside air infiltration into residential buildings as a function of the building characteristics, wind velocity, and indoor/outdoor temperature differential. The parameters for this model were evaluated by using SF6 Tracer gas decay rates in residences in Baltimore, Chicago, Denver, St. Louis, and Washington, D.C. Later, this model was used to assess the indoor air quality as a function of outdoor air quality and the air change rate.

### **Commercial Electricity Demand Forecasting**

Mr. Alereza was the program manager and a key technical contributor for a project which resulted in the development of an electricity energy use and demand forecasting model for the California commercial sector. Also included in this project was an inventory of physical and energy use characteristics of existing buildings and end-use devices in the commercial sector. This inventory was obtained through three phases of data acquisition: a mail survey, an on-site inventory survey, and spot metering of end-use devices.

### **Energy Use Patterns Analysis**

Mr. Alereza provided technical support in the development of a comprehensive methodology for analyzing energy use patterns for conservation potential at the community level, an evaluation of the impact of time-of-day price structures on commercial and industrial sectors, the development of a regional commercial sector energy forecasting model, evaluation of hot water energy use in hospitals, and an assessment of energy use and energy conservation potentials in public buildings.

### **Solar Energy Driven Rankine Cycle Engines**

Mr. Alereza has also been active in the solar energy field. He was a key contributor to a program which assessed the feasibility of utilizing Rankine cycle engines and absorption cycle equipment for the cooling of buildings. He contributed to nearly every phase of the study which addressed working fluids, solar collectors, and heat sinks as well as a comparative evaluation of the Solar Rankine Cycle, Solar Assisted Rankine Cycle, and Solar Absorption cooling concepts.

### **Publications**

Mr. Alereza has authored over twenty research papers which he has presented to the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). He has also served as the technical committee (TC) chairman on energy utilization. This committee is the cognizant TC for development of measurement and verification protocols being developed jointly by DOE and ASHRAE. He is the author of, or a principle contributor to, over 50 technical papers or major reports in the areas of energy analysis, energy conservation, and energy forecasting.

Some of the projects to which Mr. Alereza has been a principal technical contributor include:

- Conducting Survey of 500 Commercial Establishments in California, California Energy Commission
- Conducting Survey and Performing EUI Calculations for 60 Commercial Buildings, Southern California
- Conducting Survey of 400 Commercial Buildings in Baltimore, MD, Federal Energy Administration
- Development of Typical Commercial Buildings in California, California Energy Commission
- Development of Building Energy Standards for Residential and Commercial Buildings, State of Alaska
- Development of Non-Computerized Methodology for Building Energy Analysis, U.S. Army Construction Engineering Research Laboratory
- Evaluation of Residential Energy Consumption and Assessment of Technical Innovations Enabling Reduction of Energy Consumption, U.S. Department of Housing and Urban Development
- Development of Variable-Based Degree-Day Energy Calculation Method, National Bureau of Standards
- Energy Use and Electricity Demand Forecasting for the Commercial Sector, Electric Power Research Institute
- Comprehensive Community Planning for Energy Management and Conservation, U.S. Energy Research and Development Administration
- Energy Analysis for the South Florida Region, South Florida Regional Planning Council

- Hot Water Usage in Hospitals, Lawrence Berkeley Laboratory

Prior to forming ADM Associates, Inc., Mr. Alereza was Program Manager of the Western Office of Hittman Associates, Inc.

Mr. Alereza is a graduate from Auburn University with a Bachelor of Mechanical Engineering (B.M.E.), and has completed M.S. and the coursework for a D.Sc. in Mechanical Engineering at George Washington University. Mr. Alereza is a Registered Professional Engineer in the State of California.

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**Donald R. Dohrmann, Ph.D.**  
**Principal & Director of Economics Studies**

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Dr. Dohrmann, a Principal of ADM Associates and Director of the Economics Studies Division, has 25 years of business and academic experience in economic analysis, survey design, and statistical analysis. He has also been responsible for evaluating the economic viability of new energy conservation technologies and preparing forecasts of the commercial acceptance of these technologies. He has considerable experience in designing studies to collect data on energy use by commercial firms and households, in analyzing the economic factors affecting the choice of energy-using technologies for commercial, industrial and residential buildings, and in forecasting the acceptance of conservation measures for such buildings. He has been the Principal Investigator on several studies that involved designing and executing surveys to collect data on the factors affecting energy use by commercial firms and households. He has been a primary contributor to the development of end-use demand forecasting models for the commercial sector.

**Survey Design**

Dr. Dohrmann's experience in designing surveys includes:

- For the Bonneville Power Administration, he was the Principal Investigator on a study in which a survey was conducted to collect data on the prices and energy efficiencies on residential appliances. The data collected were formatted into a database for BPA's use in formulating programs to encourage households to choose energy efficient appliances.
- For the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), he has been the principal investigator on two research projects to conduct nationwide surveys to collect and analyze data on the maintenance costs of HVAC equipment.
- For the Electric Power Research Institute, he was the Principal Investigator for a study that evaluated sample survey techniques for collecting end-use data on commercial customers of electric utilities.
- For the Pacific Gas and Electric Company, he prepared the sampling plan for conducting an on-site survey of 675 of PG&E's commercial customers.
- For the California Energy Commission, he evaluated and prepared sampling plans for conducting on-site surveys of nearly 900 commercial customers of Pacific Gas and Electric Company, Southern California Edison Company, and the Sacramento Municipal Utility District.
- For the Sacramento Municipal Utility District, he designed and drew the sample for a mail survey to collect data on the saturations of residential appliances.
- For the California Energy Commission, he was a primary contributor on a project to develop common sampling methodologies that utilities in California can use to conduct mail surveys of their residential and commercial customers.

### **Energy Technology Economics**

Dr. Dohrmann also has conducted a number of studies in which the economic viability of new energy using technologies was assessed. These studies include:

- Preparing an analysis of the economics and market potential of producing hydrogen through coal gasification and through electrolysis.
- Estimating the market potential of newly developed solar cooling technologies.
- Analyzing the economic factors affecting the future equipment needs of electric utilities.
- Estimating the market potential for compressed air storage systems among electric utilities.
- Evaluating the market potential for repowering steam electric generating plants with gas turbines.

### **Energy Conservation & Load Management**

Dr. Dohrmann has conducted several studies in which energy conservation and load management measures were analyzed and evaluated. Examples of the studies include:

- For the U.S. Department of Energy and the Electric Power Research Institute, he analyzed the impacts of time-of-day electricity rates on commercial and industrial firms. He was directly responsible for the design of the sampling methodology used to select 300 industrial and commercial firms for on-site interviews and for the design of the questionnaire used during the interview.
- For the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), he analyzed the costs of maintaining heating, ventilating and air conditioning equipment in office buildings. The data for this analysis were collected through a nationwide mail survey of office buildings that was conducted in conjunction with the Building Owners and Managers Association, International.
- For a major west cost utility, he analyzed the persistence of selected conservation measures among the utility's residential customers.
- For Lawrence Berkeley Laboratory, he conducted an econometric analysis to estimate fuel choice elasticities for the residential sector.
- For the State of Alaska, he evaluated the economics of energy efficiency performance standards for residential and commercial buildings in the state.

### **Demand Forecasting**

Dr. Dohrmann has been a principal contributor on several projects to develop econometric/engineering models for forecasting the demand for electricity and natural gas in the commercial sector.

- For the Electric Power Research Institute, he prepared a report evaluating alternative methods for forecasting additions to the floorspace of different kinds of commercial buildings.

- For the Pacific Northwest Power Planning Council, he prepared an evaluation of different end-use models for forecasting energy use in the commercial and industrial sectors.
- For the California Municipal Utilities Association, he developed the specifications for simplified end-use forecasting models for the residential and commercial sectors.

Before becoming a Principal at ADM Associates, Inc., Dr. Dohrmann worked at Hittman Associates, Inc. and at the Research Center of United Technologies Corporation. He has taught economics at Yale University, the University of San Francisco, the University of Connecticut, and California State University, Sacramento.

Dr. Dohrmann graduated from Iowa State University with a B.S. in Economics. He received his M.A. and Ph.D. in Economics from Yale University.

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**Safdar Chaudhry, Ph.D.**  
**Senior Mechanical Engineer**

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Dr. Chaudhry is a Senior Engineer at ADM Associates, Inc. His professional experience emphasizes building energy end-use analysis, development of load management programs for utilities, and technology evaluation in residential, commercial and industrial applications.

Dr. Chaudhry has been involved in new residential community design under the Local Energy Assistance Program (LEAP.) He has participated in evaluation of energy conservation strategies proposed for several cities in California. He has evaluated these strategies for energy and cost savings for developers/builders, city governments and future homeowners.

He developed energy conservation evaluation procedures, monitored field staff, and reviewed recommended energy measures for the Mobile Energy Clinic program conducted for Southern California Gas Company. He also developed energy auditing and measure evaluation procedures conducted for the Lodging Industry Education Program conducted for SCG.

He has participated in the development of technology and performance characteristics, and formulating these characteristics as a function of parameters affecting the performance. He has used these functional relationships in DOE-2 building energy simulation, and other models, including TRNSYS and BLAST.

He has been involved in the following projects, related to Demand Side Management Program Development and Evaluation, Energy Auditing and Analysis, End-Use Load Profiles and Appliance Technology Assessment:

- New Construction Evaluation Program for Pacific Gas and Electric Co.
- Title 24 Plus Program Evaluation for SDG&E
- Technical review for State Schools Energy Conservation Improvements Program for the Office of Local Assistance, Department of General Services.
- Impact evaluation of adding insulation in refrigerated warehouses for Southern California Edison Company.
- Impact Evaluation of the Smart Energy Design Program for Portland General Electric Co.
- New Building Design Program for British Columbia Hydroelectric Company.
- Commercial Building Energy Use Simulation Program for Southern California Edison Company.
- Commercial/Industrial and Residential Audits for ENTERGY Services, Inc.
- On-site surveys of new commercial buildings for the Sacramento Municipal Utility District.
- New Construction Evaluation Program for the Sacramento Municipal Utility District.



- Cooperative study to assess application of geothermal heat pump system in schools.

While a Research Associate at the University of Birmingham, his activities included:

- Development of a computer based automatic control system for energy systems.
- Development of a computer based data acquisition system, and analysis tools to monitor and analyze performance of energy systems.
- Data acquisition, processing and analysis of energy systems.
- Mathematical modeling, and development of energy simulation algorithms and computer codes for a variety of engineering problems.
- Computer simulation of energy systems and performance optimization.

Dr. Chaudhry worked as a Research Fellow at the George Washington University, where he was involved in analysis of energy resources and devices, forecasting, input/output and net energy analysis, life-cycle costing, second law energy analysis and technological assessment. His experience also encompasses management of engineering projects and public administration, including planning, preparation, implementation, evaluation and economic and financial analysis. His work on energy systems have been widely published in the U.S. and abroad.

Dr. Chaudhry has, an M.S. in Mechanical Engineering from George Washington University and a Ph.D. in Mechanical Engineering for the University of Birmingham.

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### Lon Smith Senior Associate

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Lon Smith is a Senior Associate at ADM Associates, Inc., responsible for development and conducting training in the areas of HVAC systems. He has extensive experience in refrigeration, transport and control systems in residential, commercial and industrial buildings. During his previous employment of 20 years with United Refrigeration Inc., Honeywell Inc., and New England Sheet Metal Works, Inc., he has developed an exceptional understanding of not only the theoretical aspects of HVAC and refrigeration systems, but also he has mastered the practical side of these systems as well. In the past, he has provided consultation to HVAC designers, and has conducted training in refrigeration and control systems. Mr. Smith was an instructor at the State Center College District. He taught classes in pneumatic, electrical and electronic controls for commercial, residential and industrial mechanical systems. He has also taught classes on refrigerant types and their application, refrigerant recovery and power distribution systems, and their application to power line carrier transmissions. Some of the projects that Mr. Smith has been responsible for include:

- **Upstream High Efficiency Water Heater Program**, performed for Southern California Gas Co. Mr. Smith was responsible for coordination of wholesalers, verification and payment.
- **Mobile Energy Clinic**, performed for Southern California Gas Co. Mr. Smith was responsible for development of procedures and conducting training of field staff.
- **US Department of Agriculture Laboratory:** Mr. Smith was the design engineer for the control and monitoring system for the laboratory. The system had to maintain plus-or-minus ½ of a degree of dry bulb temperature, and plus-or-minus 1% relative humidity. The system had a direct digital control system that monitors the facility temperature and humidity at multiple locations within the laboratory.
- **The Women's Facility at Chowchilla:** Mr. Smith was the chief design controls engineer on this project. There were over 500 points of control that were interlocked with the monitoring of the facility. These points controlled over 100 VAV boxes, chillers, fans and pumps.
- **The White House:** Mr. Smith participated in the renovation of the chilled water system and the control systems for The White House. The system covered 2 centrifugal chillers, and allied equipment.
- **The Ethiopian Embassy:** Mr. Smith was the principal design engineer for the water-source heat pump and allied control system. This covered 3 multi-story buildings in the embassy compound.

- **Fort Belvoir and Quantico US Marine Base:** Mr. Smith was the principal engineer in the recovery of an excess of refrigerant 502 that would have been released into the atmosphere.
- **The Embassy of France:** Mr. Smith was the principal in the design of the refrigeration system for the wine cellar. The cellar holds over 1,000 bottles, with vintages dating back to the mid-eighteenth century.
- **Hilton Hotels:** Mr. Smith was instrumental in installing and using packaged room controls systems for energy conservation in Hilton Hotels. The first system was installed in the Flamingo Hilton in Las Vegas.
- **Giant Foods:** Mr. Smith was a participant in the study of retrofit refrigerants conducted by Giant Foods. In 1994 Giant Foods undertook a program to remove chlorofluorocarbon refrigerants R-12 and R-502 from their refrigerated cases, and replace them with the more ozone-friendly hydrofluorocarbon refrigerants R134a and R507. The study was done to determine efficiency losses and equipment reaction to the refrigerant changes.
- **U.S. Navy – Paxtuent River Naval Air Station:** Mr. Smith was the principal engineer in the design of the refrigerant sniffers that are installed for the cooling systems on the E3a AWACs aircraft.
- **Anheiser Busch:** Mr. Smith was a principal in the temperature monitoring and control systems for 3 different bottled storage facilities. These facilities are located in Washington D.C., Richmond VA, and Baltimore MD.
- **Bethlehem Steel:** Mr. Smith was a principal in the first conversion of an industrial steel mill, including 5 Bessemer Converters, to digital controls.

Mr. Smith is a licensed Energy Auditor for the Environmental Protection Agency and the California Energy Commission. He earned his Bachelor of Arts in Communications from California State University Fresno.

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## **Angelo Mineo**

### **Senior Electrical Engineer**

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Angelo Mineo, a senior electrical engineer with considerable experience in the energy management field, is ADM Associates' monitoring engineer. Mr. Mineo is responsible for monitoring projects for several Southern California utilities including Southern California Edison (SCE), Los Angeles Department of Water and Power (LADWP) and San Diego Gas & Electric Co. (SDG&E).

For Northern States Power's Motors and Adjustable Speed Drives Program Evaluation, Mr. Mineo conducted in-depth monitoring of the performance of high efficiency motors and ASDs at 50 sites where high efficiency motors were installed and at another 50 sites where adjustable speed drives were installed. The monitoring approach involved (1) making one-time measurements of voltage, current, and power factor of the ASD/motor and (2) conducting continuous measurements of power over a period of time in order to obtain data to develop load profiles. His responsibilities included installing and removing monitoring equipment, taking one-time measurements, collecting logger data and documenting the installation.

He was responsible for installing, troubleshooting and verifying the installation of on-site monitoring equipment at 77 commercial sites for SCE. The projects entailed monitoring of HVAC, lighting, refrigeration, internal plug loads and cooking.

For LADWP's Residential Air Conditioning Study, Mr. Mineo was responsible for customer recruitment, installation of loggers at 75 residential sites, two years of data collection and equipment maintenance. Data collected at each site included total electric load, A/C load, indoor temperature and outdoor temperature.

Mr. Mineo was involved in installing and troubleshooting load monitoring equipment at over 100 commercial sites for SDG&E. The loads being monitored included HVAC, lighting, thermal storage and process loads.

Mr. Mineo installed monitoring equipment in commercial buildings for B.C. Hydro to monitor pre-retrofit and post-retrofit lighting energy usage. His duties included tracing electrical circuits in buildings and installing and programming data loggers.

His responsibilities as an energy manager have included maintaining and modifying energy monitoring circuits for data acquisition needs, and designing and building electrical control panels, and calibrating, troubleshooting and repairing analog temperature meters. He has been responsible for the performance of time and motion studies to establish efficient systems for work-flow to the customers' needs and construction department.

As an electronic maintenance engineer, Mr. Mineo was responsible for the electrical and electronic plant systems as well as pneumatic systems, improving machinery efficiency and reducing breakdown time.

Mr. Mineo earned his Bachelor of Science in Electrical Engineering from California State Polytechnic University.

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### **Mahmoud Fouladi**

### **Mechanical Engineer**

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Mr. Fouladi is a Mechanical Engineer with ADM Associates, Inc. His primary responsibilities include conducting on-site surveys and energy analysis of residential, commercial and industrial facilities.

He participated in the on-site data collection of commercial and industrial facilities that ADM conducted for the Southern California Edison (SCE) Retention Study. The surveys consisted of 1,000 commercial and industrial sites. The project involved extensive data collection on HVAC and process equipment, lighting systems, building characteristics and operational schedules. Additionally, he was responsible for verifying the operation of energy conservation measures which had been installed through SCE incentive programs.

He conducted on-site data collection surveys of commercial facilities for the Southern California Edison Saturation Study. The project involved extensive data collection at 900 commercial sites on HVAC equipment and systems, building characteristics, lighting systems, and operational schedules, as well as installed energy conservation features.

He collected on-site data for commercial facilities for Southern California Gas Company. The project involved extensive data collection and identification of energy efficient measures at over 500 commercial sites. The sites consisted of both incentive program participants and non-participants. In addition to the standard detailed data collection procedure, the surveyors identified features that were installed as part of the program as well as energy measures that were installed by non-participants.

Mr. Fouladi's work experience also includes:

- Engineering Consultant providing technical support including cost analysis, production control, facility design, energy management, and equipment start-up, performance and control for industrial facilities.
- Project Engineer responsible for HVAC system design, equipment, ducting and plumbing installation and system performance.

Mr. Fouladi received a B.S. in Mechanical Engineering from Howard University and a MS in Energy and Power from George Washington University.

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## **Cyrus Davehlo**

### **Mechanical Engineer**

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Cyrus Davehlo is a mechanical engineer at ADM Associates. As a field engineer and trainer, his primary responsibilities are to conduct energy surveys and analysis of residential, commercial and industrial facilities.

Mr. Davehlo has considerable experience in collecting information on energy use, energy conservation, and load management in residential, commercial and industrial facilities. He is skilled at interviewing building owners and at collecting data on industrial processes, HVAC equipment and systems, lighting systems, and building operational characteristics. He is also skilled at identifying cost-effective energy conservation measures. In addition to participating on the industrial customer survey and data base development for Wisconsin Electric, he is participating in the Commercial and Industrial End-Use Survey with Southern Company Services, Inc. in Atlanta.

Mr. Davehlo was involved with the Commercial and Industrial End-Use survey which ADM conducted for Florida Power & Light Company (FP&L). This survey gathered information on the characteristics of commercial and industrial buildings through on-site visits to 1,200 of FP&L's customers. Data collected documented the structural equipment characteristics of the buildings with a view to existing and potential energy conservation measures. The data collected are also being used to prepare input for COMMEND.

Mr. Davehlo's past experience includes several years as customer representative for major HVAC manufacturers, including Trane and York. He has also managed several HVAC installation projects.

Mr. Davehlo has a B.S. in Mechanical Engineering from Florida International University, with an emphasis on Industrial Technology.



A  Sempira Energy<sup>™</sup> company



# The Gas Company's<sup>®</sup> Mobile Energy Clinic

To help our state's energy situation, The Gas Company would like to introduce our Mobile Energy Clinic program to our small-business customers.\* We're going door-to-door and canvassing our communities to share the latest energy efficiency information with businesses like yours.

There are **no out of pocket costs to you** for participating in our diagnostic energy efficiency visit.

## 3 Easy Steps:

- 1** With your permission, our Mobile Energy Clinic team walks through your facility and follows a checklist to evaluate opportunities for energy efficiency improvements. Our energy diagnostic services include:
  - Testing HVAC performance
  - Evaluating lighting systems
  - Checking proper use of other energy-using equipment such as water heaters, compressors and process equipment
- 2** When we identify appliances that could be more efficient, we make whatever appropriate no cost/low cost adjustments we can.
- 3** Concluding our visit, we'll present you with our key findings and other helpful information. You'll be on your way to reducing your energy use, keeping your costs lower and helping our community.

\*Those with less than 5000 square feet of floor space.

Continued on back





## Repairs or Adjustments to Help Optimize Your Energy Use

The no cost/low cost actions resulting from the diagnosis may include:

- Cleaning condenser coils
- Refrigerant line insulation replacement
- HVAC air flow improvement/filter change
- Outside air damper adjustment
- Thermostat reprogramming to conserve energy without sacrificing comfort
- Water heater thermostat temperature resetting and water pipe insulation
- Other no cost/low cost actions identified on site



## A Customized Report for You

At the conclusion of the site visit, you will be presented with:

- A copy of the no cost/low cost energy efficiency improvements implemented by The Mobile Energy Clinic including associated potential energy savings
- A copy of the checklist used during the walk-through evaluation with additional recommended energy efficiency upgrade actions noted on the list
- Worksheets estimating the potential energy savings and payback periods for the recommended actions
- Information/application forms for other energy efficiency products and programs offered by The Gas Company as well as other local utilities
- Other resources for energy efficiency improvements



In cases where the decision maker is not on the premises, information on the program will be left and follow-up contact will be made.

Make sure to visit [www.socalgas.com/business](http://www.socalgas.com/business) for other helpful programs, or call us at 1-800-GAS-2000.

***Glad to be of service.***



A  Sempra Energy™ company

## ***MEC Team Member Cleaning a Coil***

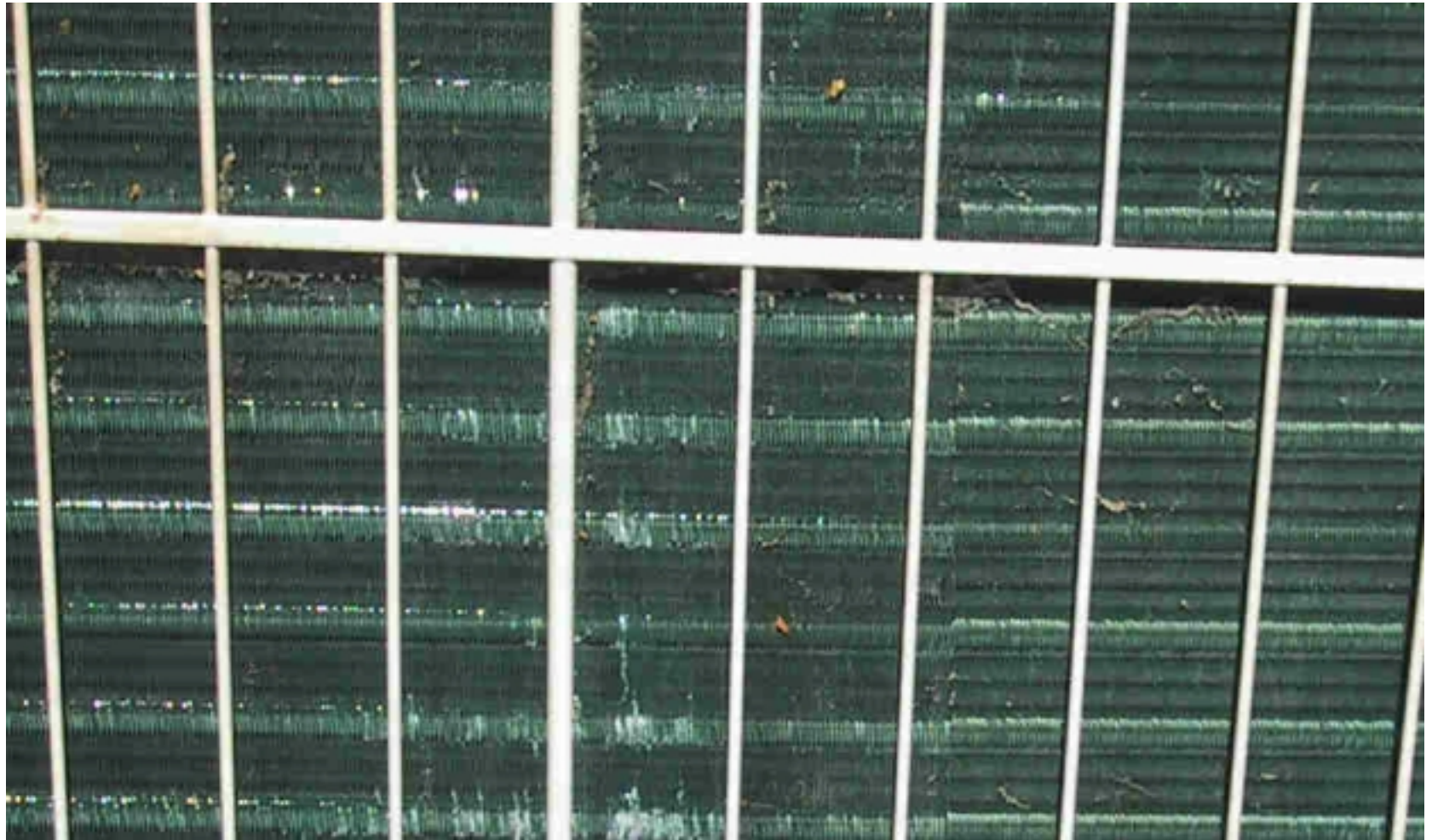




## ***Refrigeration Coil – Before Cleaning***



## ***Refrigeration Coil – After Cleaning***





## *Identifying an Unsafe Water Heater*



## ***Missing Insulation on a Refrigeration Line***



## ***Re-Insulated Hot Water Pipes***



## ***A Very Happy Business Owner!***

